

Unit 2 Review

Reasoning and Proof

Matching: Match a conjecture based on the given information. Write the letter in the blank of the corresponding number. DO NOT DRAW LINES.

- | | |
|--|---|
| <u>E</u> 1. Q is between P and R. | A. $\overline{PQ} \perp \overline{QR}$ |
| <u>D</u> 2. $m\angle RQP = m\angle PQS$ | B. $QP = PR$ |
| <u>B</u> 3. P is the midpoint of \overline{QR} . | C. $PQ = QR$ |
| <u>A</u> 4. $\angle PQR$ is a right angle. | D. \overline{QP} bisects $\angle RQS$. |
| <u>C</u> 5. $\overline{PQ} \cong \overline{QR}$ | E. $PQ + QR = PR$ |

For #6 – 9, write the statement in *if-then* form. Then write the converse, inverse, and contrapositive.

Vertical Angles are congruent.

6. Conditional: If two angles are vertical then they are congruent
7. Converse: If two angles are congruent, then they are vertical.
8. Inverse: If two angles are not vertical, then they are not congruent
9. Contrapositive: If two angles are not congruent, then they are not vertical.

For # 10 – 14, determine the truth value of the following statement for each set of conditions. If the statement is false, give a counterexample.

10. If you divide an integer by another integer, the result is also an integer. F.
The resulting number could be a fraction or decimal.
11. If next month is November, then this month is October. T
12. If this month is not October, then next month is not November. F
13. If an animal is a lion, then it is a cat that can roar. T
14. If an animal is a cat that can roar, then it is a lion. F
15. If an animal is not a lion, then it is not a cat that can roar. F
16. If an animal is a cat that cannot roar, then it is not a lion. T

For # 17 – 19, determine whether statement (3) follows from statements (1) and (2) by the Law of Detachment or the Law of Syllogism. If it does, state which law was used. If it does not, write invalid.

17. (1) If two angles form a linear pair, then they are supplementary.

(2) If two angles are supplementary, then their sum is 180° .

(3) If two angles form a linear pair, then their sum is 180° .

14. Law of Syllogism

18. (1) If 3 points are noncollinear, then they lie in the same plane.

(2) Points A, B and C are in Plane G.

(3) Points A, B and C are noncollinear.

15. Invalid

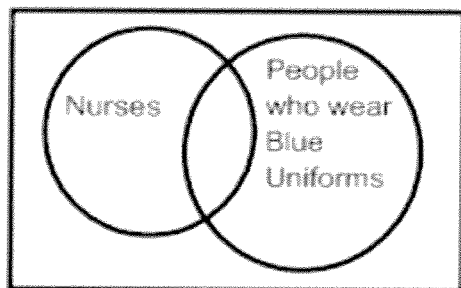
19. (1) If a number is divisible by 4, then it is divisible by 2.

(2) 64 is divisible by 4.

(3) 64 is divisible by 2.

16. Law of Detachment

18. Which statement is true according to this Venn Diagram?



- a. All nurses wear blue uniforms.
- b. Some nurses wear blue uniforms.
- c. All people who wear blue uniforms are nurses.
- d. Nurses do not wear blue uniforms.

Use the Venn diagram to answer questions # 21 – 25. There are 160 students in this survey.

21. How many students play the drums only?

35

22. How many students play drums and guitar?

4

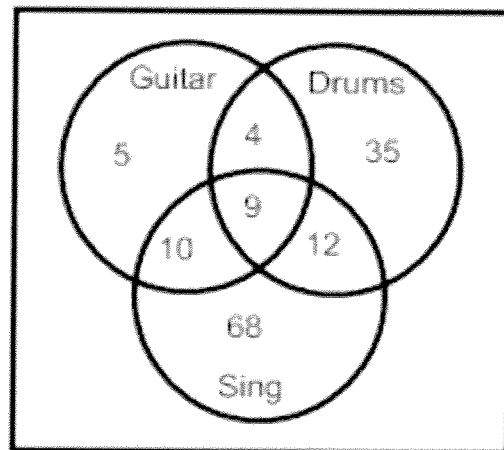
23. How many students can sing and play guitar?

10

24. How many students can play the guitar, drums and sing? 9

25. How many students **cannot** play the drums, guitar or sing?

17



$$\begin{array}{r} 35 \\ 5 \\ + 68 \\ \hline 108 \end{array} \quad \begin{array}{r} 10 \\ 4 \\ 9 \\ + 12 \\ \hline 35 \end{array} \quad \begin{array}{r} 160 \\ - 143 \\ \hline 17 \end{array}$$

For #27 and 28, fill in the missing statements and reasons with the ones provided below the proof.

Not all answers will be used.

27. Given: $\frac{8-3x}{4} = 32$

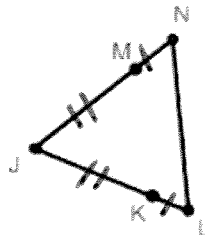
Prove: $x = -40$

Statements	Reasons
a. $\frac{8-3x}{4} = 32$	a. Given
b. $\frac{4 \cdot 8 - 3x}{4} = 32 \cdot 4$	b. Multiplication Prop of =
c. $8 - 3x = 128$	c. Substitution Prop of =
d. $-3x = 120$	d. Subtraction Prop. of =
e. $x = -40$	e. Division Prop. of =

All answer will be used, some more than once.

28. Given: $\overline{LK} \cong \overline{NM}, \overline{KJ} \cong \overline{MJ}$

Prove: $\overline{LJ} \cong \overline{NJ}$

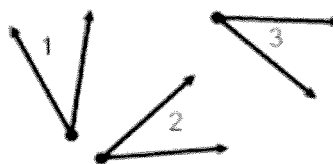


Statements	Reasons
a. $\overline{LK} \cong \overline{NM}, \overline{KJ} \cong \overline{MJ}$	a. Given
b. $\overline{LK} = \overline{NM}$ $\overline{KJ} = \overline{MJ}$	b. Definition of congruent segments
c. $\overline{NM} + \overline{MJ} = \overline{NJ}$, $\overline{LK} + \overline{KJ} = \overline{LJ}$	c. Segment Addition Postulate
d. $\overline{LK} + \overline{KJ} = \overline{NM} + \overline{MJ}$	d. Addition Property of =
e. $\overline{LJ} = \overline{NJ}$	e. Substitution
f. $\overline{LJ} \cong \overline{NJ}$	f. Definition of congruent segments

29. Given: $\angle 1$ and $\angle 3$ are complementary.

$\angle 2$ and $\angle 3$ are complementary.

Prove: $\angle 1 \cong \angle 2$



Statements	Reasons
a. $\angle 1$ and $\angle 3$ are complementary. $\angle 2$ and $\angle 3$ are complementary.	a. Given
b. $\angle 1 + \angle 3 = 90^\circ$ $\angle 2 + \angle 3 = 90^\circ$	b. Definition of Compl. \angle s
c. $m\angle 1 + m\angle 3 = m\angle 2 + m\angle 3$	c. Substitution Prop. of =
d. $m\angle 3 = m\angle 3$	d. Reflexive Property of =
e. $m\angle 1 = m\angle 2$	e. Subtraction Prop of =
f. $\angle 1 \cong \angle 2$	f. Definition of congruent \angle s

30. Complete the truth table for $(\sim p \vee q) \wedge \sim r$

p	q	r	$\sim p$	$\sim p \vee q$	$\sim r$	$(\sim p \vee q) \wedge \sim r$
T	T	T	F	T	F	F
T	F	T	F	F	F	F
F	T	F	T	T	T	T
F	F	F	T	T	T	T
T	T	T	F	T	F	F
T	F	T	F	F	F	F
F	T	F	T	T	T	T
F	F	F	T	T	T	T